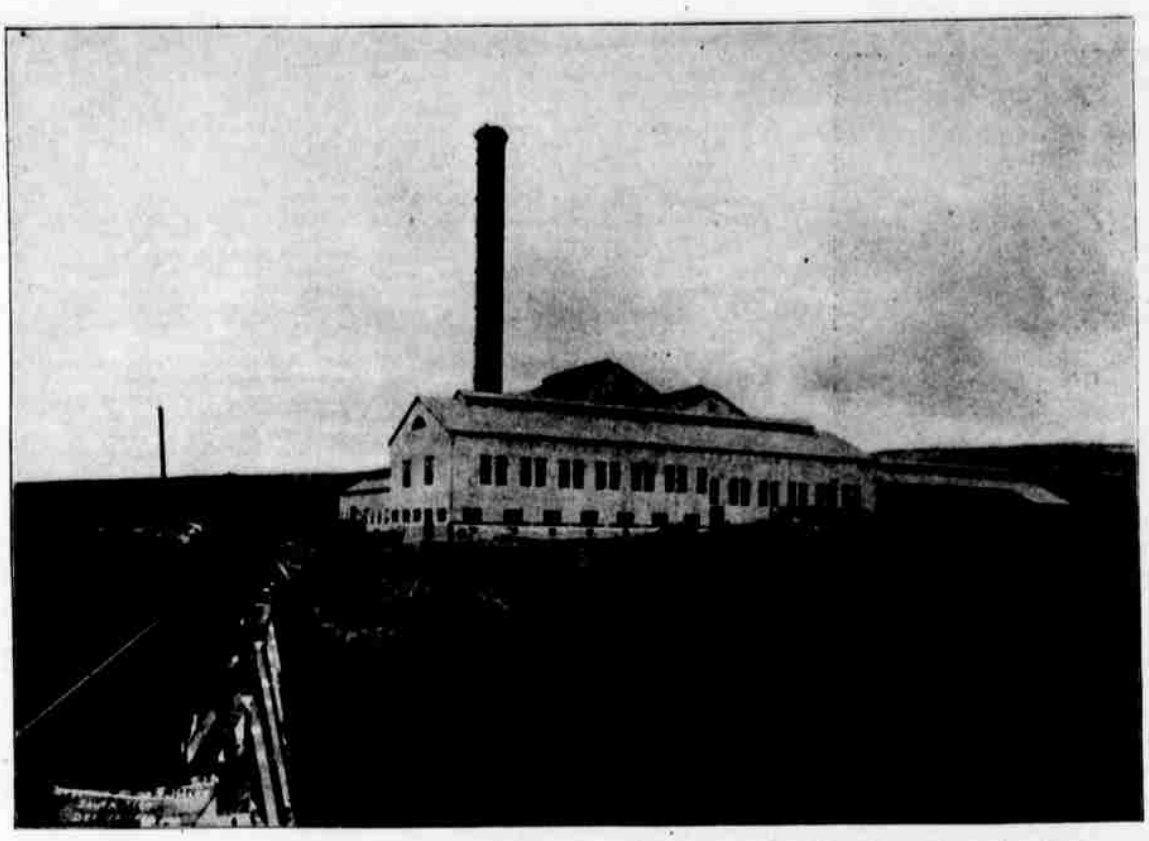

Southwesterly View of Sugar Factory on Honolulu Plantation, Capacity 180 Tons Dried Sugar Every Twenty-four Hours

certain portions of machinery in the boiling-house at a very limited outlay the plant can be brought up to a capacity of 200 tons of dried sugar per twenty-four hours. The mill proper is composed of three sets of three rollers each of 24x78 inches, and a set of two rollers forming the crusher, of 32x78 inches, all directly driven from one large single Corliss engine, with the necessary gear. The boiler plant consists of water tubular Heine boilers and American economizers. The records achieved in this boiler plant far surpass the expectations of the engineers who planned the construction. From numerous tests that have been made to ascertain the work which these boilers were performing it was found that the Heine tubular boiler was surpassing any of the old multi-tubular type by nearly 25 per cent. In other words, the evaporation as shown in these tests made on the several Heine boilers installed in this plant has been equal to the evaporation of 3.4 pounds of water to one pound of bagasse, equal to and at a temperature of 212 degrees Fahrenheit, the bagasse showing an average percentage of from 35 to 40 per cent of moisture, with about 3 1-2 to 4 per cent of sucrose therein contained.

The contemplated horsepower for the required machinery of this size plant being figured at 1500, there are six 250-horsepower boilers in this plant. The working, however, of the plant has been confined to five boilers and sometimes but four. These boilers have the Risdon Iron Works Company's automatic self-feeders and the usual trash-burning furnace of sixty inches in width, with stepladder grates and horizontal grate on bottom. The mill is supplied with cane from cars which are unloaded by the Gregg patent unloading device directly into the carrier. The trash is conveyed from the engine or mill room into the boiler portion of the said house, and there fed directly by the aforementioned automatic feeders to the boilers, the surplus trash being dropped through to the lower floor, where it is baled and used at the pumping stations. In this house space has been left for the installation of further boilers.

In the boiling and sugar house, which is a large, airy and lofty building, with a tower-like apartment in the center, and surrounded by galleries, the most modern machinery to be found in the manufacture of sugar is installed. Space also has been left for the doubling up of the plant, it being possible to install further machinery without alterations whatever to the building. This building differs considerably from other mill plants in the islands in the special arrangement of the floors and the machinery, it being noticed that considerable study and forethought were given to the said arrangement for the particular purpose of furnishing light and operating the various machines under the immediate control at all times of the sugar boiler in charge.

The machinery in this sugar house consists of a quadruple effect of the Lillie type; vacuum pans made by the Kilby Manufacturing Company; large crystallizers after the Dr. Bock pattern, made by the Risdon Iron Works Company; two large single fly-wheel Corliss valve-gear hydraulic pumps, equal to a working head of 200 pounds, which supply power for the motor-driven centrifugals; sixteen 42-inch Watson-Laidlaw water-driven centrifugals working at some 1200 revolutions per minute; sugar conveyors and elevators taking all the sugars of both high and low grades from the centrifugals without labor. The method of manufacture in this mill, like most of the modern mills, is that of making of molasses sugars, turning out "A" grades only, the low grades being remelted and worked in with the first grades. This building, like most of the modern and newer mills, includes a large sugar room and shipping shed, wherein the sugars are loaded immediately on the cars of the Oahu Railway & Land Company and then transported to the warehouses in Honolulu or loaded on vessels. The steel structure and material for this building came from the Gillett-Herzog Company of Milwaukee, the Risdon Iron Works Company being the contractors. The building was erected and put together by them, the mill building and the arrangement being designed by the Risdom Iron Works Company.

Machine Shops.—In addition to the mill plant there is also a separate coal-burning plant, which furnishes the power for the machine shop and electrical department when the mill is not in operation and developing steam from bagasse. The electrical machinery consists of a marine type direct-connected dynamo of the General Electric Company, pattern of 500 lights, arc and incandescent, and a small Ball engine, with belt-driven dynamo of 300-light capacity as supplementary. From this engine the power of the machine shop is derived as well, and from the motor in the blacksmith and carpenter shop building, situated some 250 yards distant, power is had for wood-working and blacksmithing tools in these shops. In addition to these works there are warehouses and store rooms as well as the main office situate in the vicinity of the mill building.

Pumping Plants.—There are also three pumping stations in operation, two situate in Halawa valley. No. 1 station consists of a Risdon triple-expansion, modern, up-to-date Corliss valve-gear pumping engine delivering 20,000,000 gallons per twenty-four hours to a 65-foot head, and in No. 3 station, situate some 500 yards distant from No. 1 station, there are two high-duty pumps, one triple Corliss valve-gear engine working to a 300-foot head and one to a 190-foot head, the former delivering 9,000,000 gallons per twenty-four hours and the latter 7,000,000 gallons per twenty-four hours. Therefore from this one valley there are some 36,000,000 gallons of water being drawn daily from the artesian system. Distant from these pump sites, in what is known as the Waimalu valley, some three miles, there is a further pumping station, classed as No. 2 pumping plant, which consists of one 11,500,000-gallon and one 7,500,000-gallon triple Corliss pumping engine, both engines being placed in a pit some forty feet below the surface of the ground, with the boilers on the surface above. These engines, like the others, were made by the Risdon Iron Works Company of San Francisco, and are high-duty, triple-expansion, horizontal Corliss valve-gear pumps, with all steam-saving devices. In the No. 2 and No. 3 pumping stations the Heine boilers are in use, while in the No. 1 station two of the Babcock & Wilcox boilers are in use. The work of construction of a further plant is in progress in this Waimalu valley, some 250 yards distant. There the company is contemplating the installation of two 7,500,000-gallon horizontal type expansion pumps, which will be set in a pit some fifty feet below the surface, with Heine boilers situated on the surface above. In these stations in this Waimalu valley the plants resemble more particularly large mining propositions because of the extensive underground work, in the nature of drifts and tunnels to reach the artesian wells, it being necessary to install these pump plants at such locations in the valleys as will permit of as short lengths of pipe lines for the deliveries as is possible. Therefore the necessity of setting the pumps in pits below the surface of the ground in order to connect to artesian wells below the static level in the said wells, which averages about twenty feet above sea level.

From the foregoing it will be seen that all the power plants of the Honolulu Plantation Company have been concentrated in three locations; that of the sugar factory and general works at Aiea, and those of the power and pump plants in Halawa and Waimalu valleys. From the two valleys where the pump plants are situated the lands are irrigated. The pumping plant which is now under way will consist of two 7,500,000-gallon pumps, which when erected and completed will make a total pumping capacity of 70,000,000 gallons per twenty-four hours, there now being pumping capacity equal to 55,000,000 gallons per twenty-four hours installed and in operation on the plantation.

The lands of the company are nearly all of a terminal of forty-two years, leasehold interest, the irrigating, power and mill sites being in fee simple holdings.

The average rainfall on the Honolulu Plantation is about the same as on adjoining plantations, which is about fifty inches annually. If anything, there is a little greater precipitation on account of proximity to the mountains.

As a source of convenience to laborers and others employed upon the plantation the company conducts a general store and carries a stock valued at about $20,000. Goods are disposed of to patrons at the invoice rates plus freight and handling charges, as well as clerical expenses connected with store. The management puts no restriction on peddlars, merchants or outside traders in entering camps or premises, who are desirous of disposing of wares.

A feature of the plantation is the cleanliness that pervades the camps and laborers' dwellings, which are built with the object of keeping a high standard of sanitary conditions.

James A. Low is the manager of this model plantation and has filled that position since its very inception three years ago, and for the past ten years has been identified with the sugar industry of the Hawaiian Islands.

Following is the list of officers and directors of the company:

Jno. A. Buck, President.
N. Ohlandt, Vice President.
Samuel Sussman, Treasurer.
H. W. Thomas, Secretary.
W. G. Irwin & Co., Agents, Honolulu.

Kahuku Plantation Co.

Located at the terminus of the O. R. & L. Co.'s railway system, on the Island of Oahu, and in the Koolauloa district, are the plantation lands of the Kahuku Plantation Company, comprising approximately 2700 acres, which is, all considered, good cane land.

The entire holdings are held under lease from the O. R. & L. Co. The area now planted in cane is 2300 acres of the Lahaina variety. Several attempts have been made to introduce the Rose Bamboo and Yellow Caledonia canes, but with no degree of success. The first cane planted on the Kahuku lands was eleven years ago, since which period the lands have produced well.

The soil throughout the plantation lands is of a dark-red nature, carrying some clay, and is plowed and made ready for planting by the use of two sets of "Fowler steam tackle," the soil being turned over to a depth of from fourteen to sixteen inches. The greatest altitude that cane is planted is 400 feet, and the land lies along the Pacific ocean for a length of six miles with a width of from several hundred yards to a mile and a half at the widest place.

The average rainfall at the Kahuku plantation headquarters, extending over a period of ten years, is as follows: 1891, 17.26; 1892, 36.48; 1893, 37.06; 1894, 42.95; 1895, 35.77; 1896, 27.55; 1897, 24.09; 1898, 37.98; 1899, 27.37; 1900, 38.23. For a period of six months for the year 1901 and up to July 1st, it was 24.36 inches.

At the present time the company has plowed and ready for planting for the 1902 crop some 600 acres, which are independent of the long and short rattoons. The average number of employes for the present year is fully 600 people, which includes skilled labor, contractors and company men. Like many of the plantations on the islands most of the labor connected with the growing cane is carried on by a system of contracts.

The crop for the grinding season of 1901 will aggregate 7000 tons of raw sugar, which includes the company's share of the sugar obtained from grinding the product from the Laie plantation, which is 600 tons. In this case the Kahuku plantation loads, hauls and grinds the cane for 50 per cent of the gross sugar output. The method of transporting the ripened cane from field to mill is by the aid of several miles of portable railway tracks supplied with suitable cane cars and locomotives.

The entire area of cane is under an irrigation system, there having been developed a series of deep wells, over which have been erected four pumping plants having a joint capacity of lifting 30,000,000 gallons of water in a day of twenty-four hours, in addition to which there is an auxiliary pumping plant which simply raises the water to a higher level.

There has recently been installed a "Reidler duplex" pumping plant having a capacity of 8,000,000 gallons in twenty-four hours, and is a sister pump to the Kohala plant, at Kohala, on Hawaii.

The cane is conveyed by cars to the carrier, and fed into one 3-roller and two 2-roller mills direct, the mills jointly having a capacity equal to fifty tons of raw sugar in twenty-four hours. The mill is supplied with juice strainers, open clarification system, triple-effect, settling tanks, one 10 and one 4-ton vacuum pans, ten Weston centrifugals driven by a separate engine, while two Putnam engines of large horsepower operate the machinery in the mill. The company manufactures four grades of sugar, but only one is shipped, which is known as the A brand. The remaining three low-grade sugars are remelted and reduced to the A grade.

As in other mills, there is a complete chemical control in the manufacture of sugar. The grinding season of 1900 showed a mill extraction of 90 per cent of the sucrose in the cane, while the four filter presses increases it further to about 6 per cent, after which the residue mud cakes are used for the purpose of fertilization.

The present season's crop overruns the manager's estimate by 500 tons, to which should be added a quantity of cane lost by fire during the season, which would have added to the above amount in the neighborhood of 300 tons of sugar.

The company maintains its own stores, as likewise blacksmith and general repair shops, and from general appearances the plantation is in a prosperous condition, with the possible exception of a full complement of labor.

Andrew Adams is manager of the plantation.

M. S. Grinbaum & Co. of Honolulu are interested in the plantation and are likewise the local agents.

Waimanalo Sugar Co.

On the leeward side of the Island of Oahu lie the properties of the Waimanalo Sugar Company, which comprise 8000 acres of cane and pasture lands held under a lease for twenty-five years from John A. Cummins.

The area is all former Crown lands with the exception of a few kuleanas, and the total area planted and in growing cane is

Mill and Plantation Waimanalo Sugar Company